EDITORIAL

Aortic stenosis: a moving target

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Aortic stenosis (AS) is currently the most frequent valvular disorder in aging populations of the developed countries. A rheumatic etiology has become rare, while a degenerative form has been systematically more prevalent. As a result, up to 4% of the population over the age of 65 years suffers from AS.[1-4]

The current issue of the *Polish Archives of Internal Medicine* (*Pol Arch Intern Med*) contains an interesting paper by Roleder et al,[5] which confirms the high prevalence of AS among patients hospitalized in the Silesian region in Poland during the last 10 years. A total of 605 920 patients were enrolled in a prospective registry, of whom 15 158 (2.5%) had a diagnosis of AS. Importantly, the percentage of AS patients rised from 0.95% in 2006 to 4.64% in 2016 (P <0.001). Currently, the mean life expectancy in Poland is 74 years for men and 82 years for women, and it has increased during the past 10 years by approximately 3.1 years.[6] This is probably the major reason for a rise in the number of AS cases. Another cause may be a more accurate diagnosis due to improved access to echocardiography and better skills of echocardiographers.

The recognition of low-flow low-gradient AS (LF/LG AS), a condition in which no typical AS murmur is audible due to decreased left ventricular (LV) function and low-flow velocities, is challenging.[7,8] It is particularly true in the case of paradoxical LF/LG AS, in which an aortic pressure gradient is unexpectedly low despite preserved LV ejection fraction. This condition was first described by Hachicha et al[9,10] in 2007. The registry[5] was started before this discovery, and, most probably, the definition of paradoxical LF/LG AS was adopted in the late phase of the registry. The prevalence of LF/LG AS ranges from 10% to 40% of AS patients. In the KRAK-AS registry including 653 patients with AS, a mismatch between the transvalvular gradient and aortic valve area was found in 22% of cases (unpublished data).

It is known that a severe limitation of aortic valve opening (AVA index <0.6 cm^2/m^2) is linked to a very poor prognosis, particularly at the symptomatic stage of LF/LG AS.[10] In this setting, aortic valve replacement is the only therapy that improves outcomes.[10,11] Transcatheter aortic valve replacement has an ever-expanding role in the treatment of AS, and there is growing evidence that it may be a preferred therapeutic option for low-flow AS states.[11,12]

A rare but diagnostically difficult condition is also pseudo-severe AS, in which severe LV dysfunction results in a low aortic flow rate, and the semicompliant aortic valve cannot open. As a consequence, estimated AVA values are inadequately low and surgery most probably does not improve outcomes, which is mainly related to severe heart failure due to LV damage. Mistakes in AVA calculation due to the oval shape of the LV outflow tract are also common in everyday practice, causing difficulties in aortic valve assessment. Thus, the diagnostic workup of current AS population has become more demanding than ever before, and continuing training in this field is needed. In difficult cases, it is recommended to concomitantly use other imaging techniques (eg, transesophageal echocardiography, computed tomography, cardiac magnetic resonance), which may be superior to transthoracic echocardiography. This may help optimize the assessment of the valves, cardiac chambers, and the functional status of the myocardium and facilitate proper decision making process.[13]

On the other hand, recent years have brought a rapid development of minimally invasive methods for the treatment of AS (minimally invasive aortic valve replacement, and particularly transcatheter aortic valve implantation [TAVI]). This has opened a less risky way to treat the disease even in old patients with comorbidities, who would have been considered inoperable 10 years ago.[11,14-16] With improvements in technology and implantation skills, the complication rate has decreased significantly, and the procedure may now be considered even in moderate-risk patients.[17] The number of TAVI procedures in Poland has been slowly increasing, but it does not match the growing population of AS patients at high risk of a conventional surgery.

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Apart from population growth, AS patients are also becoming older and have more and more comorbidities. As a result, they may be treated in different hospital wards. The registry[5] showed that 29% of AS patients were hospitalized in internal medicine wards; thus, detailed diagnosis is needed also outside specialized cardiology departments. Interestingly, 27.6% of AS patients had concomitant heart failure. This is the second growing problem in current AS populations worldwide, including Poland, and can result either from decompensated AS or an independent disease associated with myocardial damage (most frequently coronary artery disease, present in 41% of AS patients). Anyway, the coexistence of AS and HF is a deadly duet associated with a particularly poor prognosis and requiring prompt treatment. If the treatment is applied before irreversible LV damage, a significant improvement is possible. The registry[5] revealed a rising number of percutaneous coronary interventions (PCIs) compared with a decreasing number of coronary artery bypass graft surgeries. This can be caused by the increasing use of staged procedures, for example, a PCI followed by TAVI.

In the reported series,[5] 3.24% of AS patients died during hospitalization. However, the in-hospital mortality rate dropped from 4.5% in 2006 to 3.0% in 2016 (P = 0.02), confirming an improvement of care despite higher disease complexity observed in those patients. On the other hand, the 1-year mortality rate was higher, showing an increasing trend from 14.3% in 2006 to 16% in 2015 (P = 0.07).

Probably, a substantial number of patients in the registry had moderate AS, as only approximately 25% of them had the valve implanted. The registry[5] was based only on basic information, such as an *International Classification of Diseases* code, and did not account for differences in the severity or type of AS. Such subanalyses would be of great value. Nonetheless, the paper is an important source of epidemiological data based on a very large cohort of hospitalized patients. The high prevalence of AS, together with a dynamic increase over the last 10 years, shows that hospitals should be prepared for a higher number of AS patients, while physicians should be more alert as the disease may develop slowly, with symptoms of heart failure masking the valvular problem. Continuing training in a detailed evaluation of AS patients should be encouraged. The expected number of valvular procedures, particularly in elderly patients, will most probably further increase, which means yet another challenge for the health care system.

DISCLAIMER The opinions expressed by the author are not necessarily those of the journal editors, Polish Society of Internal Medicine, or publisher.

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